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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/686,607	10/17/2003	Wei-Tyng Hong	MR1035-1325	8940

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3458 ELLICOTT CENTER DRIVE-SUITE 101  
ELLICOTT CITY, MD 21043

EXAMINER
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SIEDLER, DOROTHY S

ART UNIT	PAPER NUMBER
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2626

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/13/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/686,607

Applicant(s)

HONG, WEI-TYNG

Examiner

Dorothy Sarah Siedler

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This is the initial office action in response to the application filled October 17, 2003.

Claims 1-9 are pending and are considered below.

#### ***Claim Objections***

Claim 1 is objected to because of the following informalities: Claim 1 states "plugging the speech signal", however "plugging" is spelled incorrectly. Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 112***

Claims 1, 6 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the inputted speech". There is insufficient antecedent basis for this limitation in the claim. Therefore the examiner interprets "the input speech signal" as "an inputted speech", this interpretation used throughout the remainder of this application.

Claim 6 recites the limitations "the non-speech output", "the Recurrent Neural Network (RNN)" and "the on-line noise model". There is insufficient antecedent basis for this limitation in the claim. Therefore the examiner interprets "the non-speech output", "the Recurrent Neural Network (RNN)" and "the on-line noise model" as "a non-

speech output" and "a Recurrent Neural Network (RNN)" and "an on-line noise model", this interpretation used throughout the remainder of this application.

Claim 8 recites the limitations "the state-based Wiener filtering method", "the signal bias compensation (SBR) method", and "the parallel model combination (PMC) method". There is insufficient antecedent basis for this limitation in the claim. Therefore the examiner interprets "the state-based Wiener filtering method", "the signal bias compensation (SBR) method", and "the parallel model combination (PMC) method" as "a state-based Wiener filtering method", "a signal bias compensation (SBR) method", and "a parallel model combination (PMC) method", this interpretation used throughout the remainder of this application.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2 and 6-9 are rejected under 35 U.S.C. 102(b) as being anticipated by **Hong** ("A Robust training algorithm for adverse speech recognition" Speech Communication 2000).

As per claim 1, **Hong** discloses a speech model training technique for speech recognition, including the following steps: separating the inputted speech into a compact speech model with clean voice and an environmental interference model (Page 276 last paragraph – page 277 first paragraph, *the first step in the REST algorithm is to segment the utterance using the current environmental inference model and environment-effect normalized model*); filtering out the environmental effects of the inputted speech according to the environmental interference model and obtaining a speech signal (page 277-278, second step of the REST algorithm, *the adverse speech is enhanced estimating the noise model, then eliminating it from the input adverse speech*); and plugging the speech signal into the compact speech model and deriving a speech training model by using the discriminative training algorithm so as to provide the speech recognition device with the speech training model for subsequent speech recognition processing (page 278, third step in the REST algorithm, *using the enhanced speech signal, the speech HMM models are re-estimated*).

As per claim 2, **Hong** discloses the speech model training technique for speech recognition as claimed in claim 1, wherein the signals of the environmental interference model include a channel signal and noise (Abstract, *channel bias and additive noise*).

As per claim 6, **Hong** discloses the speech model training technique for speech recognition as claimed in claim 1, wherein the step of separating the inputted speech is

to compare the non-speech output of the Recurrent Neural Network (RNN) with a predetermined threshold to detect the non-speech frames, and then apply the non-speech frames for calculating the on-line noise model (page 279, Section 3. The PMC-SBC method for Mandarin base-syllable recognition, last paragraph and page 280, first paragraph).

As per claim 7, **Hong** discloses the speech model training technique for speech recognition as claimed in claim 1, wherein the step of filtering out the environmental effects is performing by a filter (page 277, second step in the REST algorithm, *Wiener filtering*).

As per claim 8, **Hong** discloses the speech model training technique for speech recognition as claimed in claim 1, wherein the step of filtering out the environmental effects further includes the following steps: employing the state-based Weiner filtering method to process the inputted speech so that the compact speech model can become an enhanced speech (page 277, second step in the REST algorithm, *Wiener filtering*) ; converting the enhanced speech into a Cepstrum Domain to estimate the channel bias by the signal bias compensation (SBR) method and then converting the compact speech model into a bias-compensated speech model (page 278, (2.2), *SBR is used to estimate the signal bias, by first transforming the signal from the linear spectrum the cepstrum domain*); and employing the parallel model combination (PMC) method and

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the on-line noise model to convert the bias-compensated speech model into noise- and bias-compensated speech models (page 280, first paragraph, *using the noise model estimate and PMC Noise Compensation, the models are converted into noise-and bias-compensated speech HMM*).

As per claim 9, **Hong** discloses the speech model training technique for speech recognition as claimed in claim 8, wherein the signal bias-compensated method is to employ a codebook to encode the feature vectors of the enhanced state-based speech and then calculate the average encoding residuals, wherein the codebook is formed by collecting the mean vectors of mixture components in the compact speech models (page 280, first paragraph).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 4 rejected under 35 U.S.C. 103(a) as being unpatentable over

***Hong***.

**Hong** discloses the speech model training technique for speech recognition as claimed in claim 2, but does not explicitly disclose wherein the channel signal includes microphone channel effect and speaker bias. However, by applicants own admission (specification page 5) microphone effect and speaker bias are examples of well-known channel signals.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to filter out environmental effects, including channel effect and speaker bias, in **Hong**, since it would enable the system to remove some of the most common noise sources, thus improving the accuracy and performance of the recognition system.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Hong** in view of **Katagiri** ("New Discriminative Training Algorithms Based on the Generalized probabilistic Descent Method" IEEE 1991).

**Hong** discloses the speech model training technique for speech recognition as claimed in claim 1, but does not disclose wherein the discriminative training technique is a generalized probabilistic descent (GPD) training technique. **Katagiri** discloses a method of using a generalized probabilistic descent (GPD) for discriminative training algorithms in speech recognition (Abstract and 1.Introduction).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use the GPD technique as a training technique in **Hong**, since it



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enables a system to treat dynamic patterns and static patterns, as indicated in *Katagiri* (Abstract).

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Please see the PTO-892 form.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dorothy Sarah Siedler whose telephone number is 571-270-1067. The examiner can normally be reached on Mon-Thur 9:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on 571-272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DSS



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PRIMARY EXAMINER